

Serial No.: 10/734,022
Filed: December 1, 2003

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Remarks

The Examiner had mailed an Advisory Action on June 16, 2006 and the application was not placed in condition for allowance.

The Examiner had mailed a Final rejection on April 20, 2006, and rejected the claims 1, 8-16, 18-21 and 24-29 under 35 USC 103(a) as being unpatentable over Nishiyama (US 2004/0063827) in view of Lee et al (U S7,022,458).

Claims 1, 9, and 16 have been amended. Claims 2-7, 17, 22-23 have been canceled. No new matter has been added.

The present invention relates to a photoresist composition comprising a polymer comprising at least one unit derived from a cyclo olefin monomer and at least one unit of structure 1. The cyclo olefin monomer is a cyclic structure containing an olefin bond used to polymerize with other unsaturated bonds, as described in the specification on page 9-10.

Lee teaches a polymer comprising cyclic olefin monomer groups, and acrylate monomer groups.

Nishiyama teaches the use of the monomer Ia-25 in an only acrylate based polymeric system suitable for ArF photofabrication [0013], i.e. there are no alicyclic groups in the backbone of the polymer. Importantly, Nishiyama teaches away from the use of alicyclic hydrocarbon moieties, as disclosed in paragraph [0006];

"In the case of photoresist compositions designed for use of an ArF light source, there is a proposal to introduce alicyclic hydrocarbon moieties into resins for the purpose of providing dry etch resistance. However, the introduction of

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alicyclic hydrocarbon moieties renders the resin extremely hydrophobic, thereby yielding such a detriment that the photoresist is difficult to develop with an aqueous alkaline solution of tetramethylammonium hydroxide."

It is as a result of the perceived undesirability of the alicyclic group that Nishiyama teaches the totally acrylate based system. Nishiyama does not suggest or exemplify the use of an alicyclic moiety in the backbone of the polymer.

Since Nishiyama teaches away from the use of alicyclic groups in the polymer, one of ordinary skill in the art would not look to combine Lee's teaching for equivalent functionality. Lee teaches only a polymer comprising an alicyclic moiety in the backbone.

Thus the applicants submit to the Examiner that Nishiyama and Lee cannot be combined, and therefore the present invention is not prima facie obvious to one of ordinary skill in the art of photoresist.

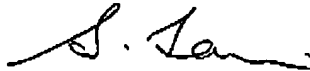
In addition to further support the novelty of the present invention, the applicant submits a Declaration under Rule 132. A photoresist of the present invention was compared for its lithographic performance with the polymer containing the important comonomers of the prior art patent of Lee et al. The polymer of Lee et al comprises units a, b, c, d and optionally e (Formula 1). The unit (a) refers to the cyclic fluoroalcohol unit, (b) refers to the maleic anhydride, (c) refers to the ester with an acid labile group or adamantane group, (d) refers to an hydroxyl ester, and (e) is an optional cyclic group. The invention of Lee et al is based on the essential unit (a), unit (b) is a cyclic anhydride and the unit (c) which provides the acid labile group. The comparative polymer used in Example 2 of the Declaration comprises the equivalent units (a), (b), (c) and (e), i.e. all the important functionalities of the polymer of Lee. The results show that the

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photoresist made with the comparative polymer has inferior lithographic performance and also becomes unstable within 1 month. Thus the photoresist of the present application has significantly and unexpectedly superior lithographic results as compared to Lee's photoresist. Therefore the Examiner is requested to remove Lee et al as a prior art reference. The applicant believes that his invention has shown to be novel and unobvious over Nishiyama (US 2004/0063827) in view of Lee et al (US 7,022,458).

In view of the above amendments and remarks, the present application is believed to be in condition for allowance, and reconsideration of it is requested. If the Examiner disagrees, she is requested to contact the agent for Applicants at the telephone number provided below.

Respectfully submitted,



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